

Greetings--

As a follow up to Jack Mustard's email from last week regarding the creation of topical white papers for the NRC Planetary Science Decadal Survey, I would like to solicit your comments and help in establishing a contribution from the atmospheric science community that meets the needs of the NRC Space Studies Board.

This new decadal survey will broadly canvas the field of space- and ground-based planetary science to determine the current state of knowledge and then identify the most important scientific questions expected to face the community during the interval 2013-2022. Background concerning the Planetary Science Decadal Survey can be found at:

<http://www7.nationalacademies.org/ssb/SSEdecadal2011.html>

and further information about Mars-related contributions can be found at the MEPAG website at:

<http://mepag.jpl.nasa.gov/decadal/>

Our atmospheric science community input to a Topical White Paper will complement a broader effort being undertaken on behalf of the wider MEPAG community (the so-called 'MEPAG White Papers'), but will be considerably more detailed, and focus on Mars atmospheric science only.

Specifically, at this time, I seek your thoughtful response to the following query:

What are the key scientific questions that will be driving Mars atmospheric science in the coming decade?

What I would like to address in this white paper is a sense of scientific vision for the community over the next 10-15 years, and I think a general agreement on this very important question should be a top priority as the SSB will likely give the greatest weight to those arguments that have wide community consensus. In light of your answer to the above question, I would appreciate your answers to the following supplemental questions as well:

What is the current state of knowledge about the martian atmosphere? (This should include data-in-hand and expected data through the 2013 MAVEN mission.)

What discoveries in the past decade have led us to the key science question(s) you have identified above?

What progress can be made in the next decade to answer these questions, and how? What do we need to understand to make progress?

What type(s) of missions are necessary to obtain answers to these questions?

On this last question, please keep the following thought in mind. With respect to the high-priority questions you have identified above, what type of mission would provide the best value while addressing those questions? These can be either full missions (Discovery/Scout class, New Frontiers, Flagship) or payloads on future spacecraft. I am more interested in mission types and a focus on how they might lead to a breakthrough in understanding (e.g. 'We should fly a single orbiter dedicated to exploring the middle atmosphere because that's a largely unknown region of the martian atmosphere. It should be a multi-year investigation which could be flown as a Scout-class mission...') and less so in instrument specifics (e.g. 'We should fly a tri-axis widget because it provides the best vertical resolution with lowest S/N between 50-80 km....'). Another way to put it would be to give *priority to the science questions, NOT the mission specifics*. (And please do prioritize your list!)

These questions are intentionally broad, so feel free, if necessary, to focus on your specific area of expertise. Answers of any length are welcome, no matter how brief or detailed, and international participation is absolutely encouraged. I would ask that you please focus on obtainable goals for the next decade or so. While the focus of your answers should definitely be on atmospheric science, keep in mind that the final product will be a **planetary science** decadal survey, so try to craft your responses such that you address why these questions are important to planetary science as a whole. Narrowly focused science objectives will likely not be well received by the SSB. On the other hand, putting Mars exploration into context with exploration of the rest of the solar system will be encouraged.

My goal is to have a draft ready by the time of the next MEPAG meeting on July 29-30, which means time is short! I thank you in advance for your time on this matter and for your forthcoming contributions. Over the coming weeks, as responses trickle in, you will be further contacted with drafts of the white paper to comment on, additional questions and requests. To ensure this gets the widest distribution, kindly spread the word amongst your colleagues and those who may not be on distribution (MEPAG, MAOMW, etc.) mailing lists. If you have any questions, please do not hesitate to contact me via email or phone.

Sincerely yours,

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